THE FOREIGN CHEESE BUSINESS IN WISCONSIN.

An Address given by Prof. John W. Decker.

(Illustrated by stereopticon views made from photographs taken by him.)

In the course of our address we will by means of pictures show the process of manufacture of four kinds of cheese which are made in Wisconsin, and are termed "foreign" cheese. The four kinds are the Swiss, Brick, Limburger, and Edam. With the exception of the last-mentioned cheese, the business is so extensive as to be really as much American as the American cheddar cheese. Four hundred carloads of cheese, amounting to about ten million pounds, were shipped out of Monroe the past season, and the amount made in Dodge and other counties will probably bring the amount up to fifteen million pounds.

LOCATION OF BUSINESS IN WISCONSIN.

Green county is the great Swiss cheese county of the state. In this county nearly all of the "drum Swiss," or "round Swiss," cheese, is made and considerable block cheese. The district extends over into the eastern border of La Fayette and Iowa counties, and the southern part of Dane county. The towns of Washington and New Glarus in Green county, and the town of Primrose in Dane county, a strip of county six by eighteen miles in extent, is where the most of the brick and Limburger cheese of this section is made.

Jumping over into Dodge county we find more brick cheese factories, some block Swiss factories, only a few drum Swiss, and a good many Limburger factories. Scattered over Fond du Lac county are about eight brick cheese factories, and then in northern Winnebago county west of Lake Winnebago are brick and block Swiss factories. Then jumping still further north into Marathon county are probably a dozen more brick and limburger
factories. There are three factories in La Crosse county and quite a number in Trempealeau and Buffalo counties.

It is with pleasure that I present this subject, for the cheddar cheese makers know little about this extensive business in our state. The work of the Association has been almost entirely among the cheddar makers. In the past ten years the quality of cheddar cheese has been greatly improved, and the intelligence of the makers raised immensely by the work of the Dairy School and the Dairymen's Association. The makers of brick, Swiss and Limberger are almost entirely foreigners who speak English poorly, or not at all. They are where the cheddar makers were ten years ago. They need our help, though many of them do not know it, and are satisfied to travel the road their grandfathers' trod fifty or a hundred years ago in Europe. We must get hold of them and wake them up and make them feel that they should have a part in the good things the cheddar makers are partaking

Fig. 1.—Five Corners cheese factory, 3 1/2 miles southeast from Monroe, Wis. This is a combined butter and cheese factory, butter being made during the winter. The portion of the building extending back is the residence part, under which is the cellar.
of. I will introduce them to you tonight and I want you to get acquainted with them. I will take up each kind of cheese by itself, describe it, and tell how it is made.

![Image: The Raub Factory, 3 1/2 miles east from Monroe, Wis. The cheesemaker, Mr. John Wyse, lives in the wing. The barrels in front are for the whey, each patron having a barrel. The trough over the barrels has a hole over each and the whey is thus distributed to the different barrels.]

**SWISS CHEESE.**

Swiss cheese is an imitation of the imported Swiss cheese, and is often quite as good as the imported article. It is made in large round cakes about four inches thick and nearly three feet in diameter, and the cakes average one hundred and eighty to two hundred pounds in weight; or, it is pressed in blocks six inches square by twenty inches long, weighing thirty pounds. This latter style is known as block Swiss.

Swiss cheese should have a good "dough",—that is, should have such a consistency of texture that it can be molded in the fingers like dough. It should have large round holes or "eyes" nearly half an inch in diameter distributed evenly through the cheese, and these eyes should have a glossy surface. Fig. 3 shows a cheese cut open so as to show the eyes. Sometimes the cheese gets to "working" too fast and the eyes get blown up too large, and the cheese puffs, as shown in bock cheese in Fig. 5.
In other cases pin holes form the same as in cheddar cheese, and such a cheese is termed a "nessler." If the cheese is pasty in texture, the "eyes," if any form, are not glossy and cracks or checks appear in the texture, and such a cheese is called a "glassler," because it resembles the fracture of a piece of glass. A cheese without any holes is said to be blind. Fig. 7 shows a number of plugs illustrating the different kinds of cheese.

Fig. 3.—A typical Swiss cheese, cut showing characteristic holes or "eyes." A square on top of it shows its size. The eyes reflect the light showing that they have a shiny surface.

In flavor, the cheese should be fine; in color, it should not be yellow, but white, to imitate the imported cheese.

Cheese is divided into three grades:

<table>
<thead>
<tr>
<th>Texture</th>
<th>Flavor</th>
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<tr>
<td>No. 1. Right dough and good eyes</td>
<td>Good.</td>
</tr>
<tr>
<td>No. 2. Glasslers, nessler, blind</td>
<td>A little off.</td>
</tr>
<tr>
<td>No. 3. Cracked, rat-eaten</td>
<td>Bad.</td>
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When a buyer grades a cheese he puts one, two, or three marks in the edge to indicate the quality.

No. 2 brings about one cent less than No. 1, and No. 3 half price, or less.
Swiss cheese is cured at least three months before selling, and is sold in the ideal way—that is the buyer grades the cheese in the curing room in the presence of the maker.

![Image](image_url)

**Fig. 4.—Block Swiss cheese as it appears when of fine quality.**

**THE PROCESS OF MANUFACTURE.**

Swiss cheese is made twice a day in large copper kettles holding two or three thousand pounds of milk. The milk is strained into the kettle and being still warm as it has just been milked and brought to the factory, the rennet is added and the milk curdled. The rennet used is made by soaking rennets in whey to which a little salt has been added. This is a bad thing as the whey often inoculates the milk with gas germs which cause much trouble. The Swiss maker has had it handed down to him from his grandfather that rennet extract will not make good cheese. Our cheddar makers believed the same thing fifteen years ago. I believe that the glasser cheese comes from too sweet milk—that there is not enough acid in the milk to make the rennet expel the moisture sufficiently, and in such cases the whey may act as a starter and be beneficial, but I believe they should steer clear of a whey rennet.
When the curd is firm enough it is cut with a Swiss harp into large cakes and then stirred with a wire stirrer. Both instruments are shown in Fig. 8. When the curd is fairly fine the kettle is swung over the fire. The kettle hangs on a large wooden crane so that it can be swung over or away from the fireplace as desired. The front of the fireplace is made of sheet iron and swings around the front of the kettle.

The maker stirs the curd constantly till it reaches about 41 Reamer or about 130 degrees F., and then swings it away from the fire and keeps stirring it until it is firm enough. He tells the proper cook by feeling of it, and by the squeaking between the teeth. When stirring the curd round and round in the kettle, the current is broken by a wooden wing inserted in one side of the kettle. When the curd has been stirred enough this wing is taken out, the curd is started around, and settles in the eddy in the middle. After settling together for a few minutes it is gathered up into a linen strainer cloth. The cloth is wet on the edge, and the edge rolled onto a steel band. The opposite edge is
held by an assistant, or in the operator's teeth, while the edge of the steel band is shoved under the lump of curd. The corners are tied together and the cloth hoisted with a block and tackle which runs on a track like a hay fork. It is then pushed over to the pressing table, which is an inclined table built on a stone or brick foundation at one side of the room.

If a drum Swiss is to be made it is let down into a round hoop, but if a block Swiss into a rectangular mold. The mold or hoop is adjustable so that the volume can be changed to make the cheese a uniform height, but vary in diameter to suit the quantity of curd. A heavy press board is placed on top and the weight of a heavy beam placed on it. After pressing a while it is turned over and another cloth wrapped on the other side of it; in fact, the cheese is turned a number of times and the cloth adjusted carefully. If block Swiss is to be made, at the end of twelve-hours it is cut into blocks six inches square and placed in another mold with partitions, or in separate molds.

The cheese is pressed for twenty hours and then has the date marked on it with lamp black, and is taken into the cellar and placed in a tank of brine to be salted. The brine is made strong enough to float an egg, and the cheese remains in it three days.
It is then placed on a shelf and a little coarse salt is sifted on it. In order to get the eyes started the temperature of the room should be about seventy degrees. After the eyes start the cheese should be removed to a cooler room.

Fig. 7.—A series of plugs from Swiss cheeses of different quality. Nos. 1, 2, 3 would be classed as No. 1 cheese, though 2 has rather too many holes. Nos. 4 and 5 show the cracks of a glasser and the corresponding pasty appearance. No. 6 at the upper end indicates a nesser, though a typical nessler would have the small holes the entire length of the plug. No. 7 is what would be termed a blind cheese as there are no “eyes” or holes.

If the cheese molds it is brushed or washed so that it will keep bright. It is important to have enough moisture in the room. If it becomes too dry the eyes will not form. A steam boiler is usually kept to let the steam out and supply the moisture needed.

SHIPPING THE CHEESE.

When the cheese has been sold, it is boxed ready to ship. The drum Swiss is put into a round tank made so that six cheese will just fit into it, and six of these cheese will often weigh a thousand pounds. Fig. 17 shows a load of three of these tanks which weigh together a ton and a half.
The block Swiss is put up in boxes 6x20x36 inches, making six cheese in a box weighing 160 to 180 pounds.
The cheese goes all over the United States.

Fig. 8.—Tools used in making Swiss cheese. 1. a wooden scoop. 2. Swiss harp. 3. Wire curd stirrer. 4. Wooden partition which fits into kettle to break the current when stirring.
BRICK CHEESE.

Brick cheese is made from sweet milk usually delivered twice a day, though this is not necessary where the farmers take good care of the milk.

Fig. 9.—Swiss kettle in the Raub factory. The kettle hangs on a heavy wooden crane. The front of the fire place over which the kettle hangs also hangs on a crane and can be swung out so that the kettle can be swung away from the fire. The opening below the grate will be seen in front of the kettle. The round cover is dropped over the top when kettle swings forward.

The curd is cooked up in a vat in every way like cheddar, excepting that no acid is developed before drawing the whey, and the temperature at which it is cooked is about one hundred and fifteen. The whey is drawn when the curd is firm enough and the curd dipped into wooden molds. These molds are wooden (I have seen perforated tin molds) either eight and a half or ten inches long by five inches wide and six or eight inches deep. The sides have grooves cut with a saw and perforated to facilitate the escape of the whey. An inclined draining table with sides about two inches high is used on which to press the cheese. Usually a series of perforated draining boards is laid on the table and covered with a linen strainer cloth. The molds are placed on top of this side by side. Fig. 19 shows the construction of the
molds and draining boards and Fig. 20 shows them in use. The curd is placed in the molds and the whey drains off. A follower is placed in the top of the mold and two bricks placed on top for weight. I suppose that the cheese gets the name "brick cheese" because it is shaped like a brick and is pressed under the weight of bricks.

It is turned over several times to press and drain evenly. At the end of twenty-four hours it is taken into the salting room which is a part of the cellar. Here it is rubbed with salt and piled together on a table with sides six or eight inches high. The second day the crevices are scraped full of curd. Salt is rubbed on each day for three days, and gradually works into the cheese. The moisture that is expelled by the salt drains off from the inclined table. The salt should be rather coarse, for fine salt dissolved so fast that it cuts the casein and makes a slimy or "burned" surface. The cheese goes onto the shelves in the curing cellar where it is turned and washed two or three times a
week until cured. It is shipped out at about a month old. Each cheese is wrapped in a sheet of manila paper. There are about twenty to twenty-five cheese placed in a rectangular box, the cheese in a box weighing one hundred to one hundred and twenty pounds.

A round cheese is made in every way like brick cheese, except that it is pressed in round instead of rectangular molds. It has been called Munster. It is shipped in the same sized boxes as ordinary brick.
LIMBURGER CHEESE.

Limburger cheese is made much like brick cheese—the real difference being that it is softer than brick.

Fig. 12.—A round Swiss cheese in the hoop. The cheese is made the thickness of the hoop, and the diameter is adjusted accordingly by the rope which runs around it. A round board lies on top and presses the cheese into the hoop.

It is made in an ordinary vat out of sweet milk. It is cooked at 94 to 98 degrees F. The curd is placed in molds similar to the ones used for brick cheese with the exception that they are twenty inches long. The curd is not pressed as in brick cheese, but it is simply allowed to settle. It is taken out of the molds in a few hours and cut into blocks five inches square. These blocks are then placed on a draining table with wooden partitions be-

Fig. 13.—Block Swiss moulds. A, the adjustable end, moved by a screw. B, the partition which fits into the grooves making the right sized moulds after the blocks are cut. C, the cover or follower.
tween. When a row has been completed a long wooden strip is placed against them and another row laid down. These partitions and strips keep the cheese from spreading. Such a draining table is shown in Fig. 23.

![Image of cheese factory](image)

**Fig. 14.—Interior of Five Corners factory, showing a cheese in the press and the means of adjusting the pressure. The small engine and churn are for making whey butter.**

The next day the cheese is taken into the cellar and salted the same as brick cheese. The cheese being soft, a rubbing with the hands will fill up all crevices. They are then placed on the shelves to cure. The cellar must be moist and the cheese is dipped in water every day or two to keep it soft. A putrefactive fermentation starts on the outside and works to the center in the course of a month or six weeks. In the cellar this cheese does not smell strong, but when exposed to a warm temperature for a few hours it will assert itself. It is wrapped in manila paper and then in tin foil and is packed in boxes like brick cheese. **Fig. 24 shows a limburger cellar. The salting table is immediately in the foreground. The cheese is piled on the shelves.**
Fig. 15.—Curing cellar in Five Corners factory, near Monroe. The large drum Swiss cheeses are on the shelves. The small boiler supplies steam for moisture when too dry.

Fig. 16.—Block Swiss cheese in cellar at Stearns' factory. The large brush B on the post is used for washing drum Swiss cheese. The brine tank A is to be seen.
Fig. 17.—A load of three tubs of cheese weighing a ton and a half being delivered at Gunert's warehouse, Monroe.

Fig. 18.—Wisconsin State Instructor, U. S. Baer, making a curd test. The two presses are different from the forms shown in figure 16. Here each block is in a separate form.
Fig. 19.—Brick and Limburger cheese moulds. A, moulds. B, follower. C, draining board.

Fig. 20.—Brick cheese in the moulds. A cloth is placed under the moulds.
Fig. 21.—Round brick or imitation Munster cheese in the tin moulds.

Fig. 22.—Brick and Munster cheese in curing cellar.
Fig. 23.—Limburger moulds on draining table showing the long pieces and the short partitions between.

Fig. 24.—Limburger cellar. In front is the salting table with the cheese in the salt. In the foreground is a box containing salt. The cheese is to be seen on the shelves.
EDAM CHEESE.

Edam cheese gets its name from a city of that name in North Holland. We get the cheese in some of our best grocery stores. It is round like a cannon ball, six inches in diameter, weighs four pounds, and costs the consumer one dollar.

It is made in Wisconsin in very limited quantities, but when properly cured is equal to the best imported Edam.

As I have visited Holland, and took some interesting photographs bearing on the subject, I will explain the cheese and its manufacture as I found it there.

Fig. 23.—Farm buildings at De Ripp, North Holland. J. W. Decker in foreground.

As you know, the land is low, a great deal of it being below the sea level and surrounded by dikes over which the water is pumped into the sea by big wind mills and steam pumps. On the flat grassy pastures are found black and white cattle known to us as the Holstein Friesians. It is from their milk the Edam cheese is made. There are but few factories, the most of the cheese being made on farms in a very crude manner. The farm
building, including living rooms, stable, etc., are usually under one roof. Fig. 25 shows such a place where I saw Edam cheese made. Fig. 26 shows the inside of the stable with cheese curing on a shelf. The cattle are turned into the fields in May and remain out till November. At this place near De Rijp the night’s and morning’s milk, about 600 pounds, was put into a large wooden tub. A little milk was heated in a kettle and added to the milk to raise it to a temperature of 86 degrees F. Then the color and rennet extract was added. I should say that before these were added a starter of sour whey was added. They sometimes have serious trouble with gas germs and the lactic acid whey starter is added to overcome this. I believe it is also what gives them their characteristic flavor, for a good Edam flavor is the same as a good cheddar a year old.

The milk curdled in thirty minutes and was then cut the same as cheddar cheese. As soon as sufficient whey separated it was dipped out and heated in a kettle, and then poured back into the tub. This raised the temperature to 90 degrees at which temper-
ature it was firmed. It became as firm as cheddar or Swiss curd, and would squeak between the teeth. The whey was then drained off and the curd was put into the molds.

The molds are made of wood, one piece being turned into a cup with a spherical bottom and a top piece to fit into it closely, so that the cheese will be spherical. There are a few holes in the mold and top to let the whey drain out. The curd is worked down into the mold and squeezed and pressed by the hands to make it perfectly solid. It is then put under pressure for a short time and then taken out and wrapped in cloth and returned to the press. Usually two molds are put together one on top of the other and a vertical timber 4x4 inches three feet long drops onto them for pressure. At this place the farmer had a gang press.

![Curing room of an Edam cheese factory in North Holland.](image)

The cheese is pressed till the next morning and then taken out and rubbed with salt and put into a wooden salting cup the same shape as the wooden molds. After salting for three or four days they become hard enough to resist pressure with the fingers, and they are placed on the shelves to cure. As I have said, most of the
cheese is made on farms, but there are a few factories. I visited
one factory receiving nine thousand pounds of milk a day.
There were five hands employed, and they paid for milk accord-
ing to test. The milk was tested at the experimental station at
Hoorn once a month. Fig. 27 shows the cheese in the curing
room at this factory.

The cheese is held till about a month old. Any mold that
may have gathered on it is washed off, and the cheese when dry
are rubbed with linseed oil and sent to market, where they bring
nine or ten cents a pound. The Edam cheese that is brought to
this country is held till well cured, and then sells at retail for
twenty-five cents a pound.

![The weekly cheese market at Hoorn, North Holland. The market building where the cheese is weighed is just beyond the statue.](image)

We can make just as good or even better cheese than they, for
we have richer, better milk. They have a cool moist climate,
which is all in their favor, for Edam cheese should be cured at
about 60 degrees F. If we can keep the temperature of our cur-
ing rooms right and then do not get in too big a hurry for returns
and sell the cheese green, we in Wisconsin can compete with the-
world on Edam cheese. N. Simon at Neenah has made some that were fine.

A CHEESE MARKET IN HOLLAND.

Edam cheese in Holland is carried in carts to the market. Straw is laid on the pavement and the cheese piled in a pyramid on the straw. A cloth is then thrown over it to protect it from the heat of the sun till the market opens.

![Fig. 29.—Weighing Edam cheese at the market at Hoorn.](image)

The buyer passes along the piles and plugs one cheese in a pile, and makes an offer which is accepted or rejected. Fig. 28 shows such a market scene at Hoorn. When the cheese is sold it is piled onto skids and carried by porters shown in Fig. 29 dressed in white suits to the market building to be weighed. At the Hoorn market building there are three immense balances hung from the ceiling. The cheese is placed in one scale pan and heavy weights on the other to balance. This is the official weighing. The cheese is then turned over to the buyer.
Such is the process of manufacture and the marketing of Edam cheese in Holland. We can make just as good an article in Wisconsin. A case of twelve cheese weighing forty-eight pounds brings $7.50 or sixteen cents a pound. I have had letters from quite a number of firms in the east wanting Edam cheese, and I believe that there is a field here that should be worked.

Music: Octette of male voices from the Short Course and Dairy School.

The President: The next we have on the program is the "Outlook of the Cheese Industry in Wisconsin," by W. W. Chadwick, Assistant Dairy and Food Commissioner, Madison, Wis.

OUTLOOK OF THE CHEESE INDUSTRY IN WISCONSIN.

W. W. Chadwick, Madison, Wis.

According to the last report of the Department of Agriculture there are 15,990,115 milch cows, nearly 16,000,000 in the United States. In 1895 an enumeration of the milch cows in this state two years old and over was made for the first time and the number reported was 842,039. Of this number the milk of about 200,000 is used to manufacture cheese.

It has been said "Americans taste cheese, while Europeans eat it." In Great Britain and most of the countries of Europe cheese is one of the chief articles of food. They use it as freely as we do meat. This substitution is found to be economical and satisfactory to consumers. In these foreign countries the consumption of cheese per capita is several times as large as in the United States. It seems clear that a taste for cheese has never